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# EFFECTS OF INTEREST RATES ON THE PERFORMANCE OF REAL ESTATE INDUSTRY IN KENYA: A CASE OF NAIROBI COUNTY

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**Abstract**

***Purpose:*** The study sought to determine the effects of interest rates on the performance of real estate industry in Kenya: A case of Nairobi county.

***Methodology:*** The study adopted a descriptive survey research design.

***Results:*** The study findings revealed that lending interest rates had a negative and significant relationship with real estate growth in Nairobi. The findings show that deposit interest rates were insignificantly related to growth of the real estate firm in Nairobi. The long run model findings also revealed that overdraft interest rates had a significant relationship with real estate growth in Nairobi. The findings revealed that inflation had a negative and significant relationship with performance of real estate firms in Nairobi. GDP growth was found to have a positive relationship with the performance of real estate firms though the relationship was insignificant.

***Unique contribution to theory, practice and policy:*** The study findings revealed that lending interest rates have a negative and significant relationship with real estate growth in Nairobi. The study recommends that the CBK should implement monetary policies that aim to reduce the lending interest rates that financial institutions charge on lending so as to bring stability in the industries including real estate industry. The study recommends that the Central bank of Kenya as well as the Treasury should come up with monetary policies to regulate the rate of volatility in inflation rate in the long run since long term investors in real estate are likely to suffer loses if the economy is characterized by unstable rates of inflation. The study findings also indicated that GDP growth has a positive relationship with the performance of real estate firms in the long run. The study recommends that the government should reexamine the strategies and policies that aim to spur GDP growth.

***Keywords:*** *lending, interests rates, performance, real estate industry, deposit, overdraft, GDP growth, inflation rates.*

## 1.0 BACKGROUND OF THE STUDY

The growth of real estate industry is vital in the overall economic growth and development of nations as it increases the well-being of household by providing superior shelter and helping establish personal wealth that can be leveraged for creation of more wealth (Taylor, 2009). In addition, real estate industry development contributes to employment, the development in commercial banking and ultimately to the development of capital markets. Globally, the real estate market was initially dominated by institutional investors as individual properties were not bought and sold on a regular basis like stocks and bonds (Kohnstamm, 1995). As opposed to the well developed countries that use stocks and bonds, financing of real estate development in the less developed states like Kenya is predominantly through mortgage financing.As early as 1980s, mortgages and real estate development services were supplied primarily by building societies (Crowley, 2004). However, following the de-regulation of the financial services industry in the 1980s, increased number of building societies were compelled to compete with banks and other financial groups who were offering the mortgage services (McKinnon, 1973). One of the outcomes of the de-regulation has been the continuously increasing competition in the real estate industry as various firms now offer mortgages more freely and as a result the demand for owner occupied property has increased. The decision to venture into mortgage is, to a great extent, determined by the interest rate. Taking a mortgage is one of the biggest financial commitments that one can make and commercial banks as well as mortgage lenders have been experiencing high demand from customers seeking for financing to realize their dreams of owning a home. Interest rate targets are a vital tool of monetary policy and are taken into account when dealing with variables like investment, inflation, and unemployment. The central banks of countries generally tend to reduce interest rates when they wish to increase investment and consumption in the country's economy. However, a low interest rate as a macro-economic policy can be risky and may lead to the creation of an economic bubble, in which large amounts of investments are poured into the real-estate market and stock market.

### 1.1 Interest Rates in Kenya

The interest rate refers to the percent charged when money is being borrowed and paid when money is being loaned. It is a cost to the borrower because it is the rate at which the borrower pays back the lender for the use of their money. According to Amadeo (2012), the interest rate that the lender charges is a percent of the total amount loaned; that is, the rate at which interest is paid by borrowers for the use of money that they borrow from a lender. It is normally expressed as a percentage of the principal for a period of one year. Amadeo (2012) adds that the interest rate that an institution, say a bank, pays to hold one’s money is a percent of the total amount deposited. As such, anyone can lend money and charge interest, or hold deposits and pay interest. Interest rate is the price a borrower pays for the use of money they borrow from a lender/financial institutions or fee paid on borrowed assets (Crowley, 2007). Interest can be thought of as "rent of money". Interest rates are fundamental to a ‘capitalist society’ and are normally expressed as a percentage rate over the period of one year. Interest rate as a price of money reflects market information regarding expected change in the purchasing power of money

or future inflation (Ngugi, 2001).The interest rates in Kenya have risen uncontrollably since in the last 4 years with the Central Bank of Kenya (CBK) increasing the Central Bank Rate (CBR) from 7% to 18% between 2010 and 2014 in an effort to tame runaway inflation and stabilise the weakening shilling (Omengo, 2012). At the same time, most of the commercial banks increased their lending rates from low figures of 11% to about 25%. The assumptions and expectations made by most of the Central Banks are that technically lowering the interest rates produces the effect of increasing investments and consumptions (Keynes, 2008). However, low interest rate by macro-economic policy is also risky and would also lead to the creation of massive economic bubble particularly evident when great amount of investments are poured into the real estate and stock market (Bhattarai, 2006).According to Bhattarai (2006), any changes in the interest rates profoundly impacts on saving and consumption behaviours of households; investment and capital accumulation decisions of firms and portfolio allocation of domestic and foreign traders in the financial rate markets. The changes in the the interest rates that banks charge make loans either expensive or affordable. When interest rates are high, fewer people can afford to borrow and this lowers the amount of credit available to fund purchases, slowing consumer demand. At the same time, it encourages more people to save so as to receive more on their savings rate. In addition, higher interest rates reduce the capital required to expand businesses and slows the economy down because of strangling supply (Amadeo, 2012). Low mortgage interest rates stimulate demand for real estate (Amadeo, 2012; Bienert & Runauer, 2006).

### 1.2 Problem Statement

The real estate sector being one of the major sectors of the economy in Kenya has been largely affected by fluctuating interest rates. The study seeks to show case this effect by showing how real estate growth is affected by the cost of borrowing. Real estate is a large investment which requires huge capital that most ordinary Kenyans cannot raise, therefore they turn to banks to finance this cost of construction or purchase. The cost of borrowing in all banks is driven by the real interest rate which is fuelled or largely accommodates inflation. Inflation is the key driver of interest rates. Interest rates, especially the rates on interbank exchanges and treasury bills, have as profound an effect on the value of income-producing real estate as on any investment vehicle. In recent years a number of countries experienced a rapid increase in housing market activity, which coincided with a period of low real and nominal interest rates. The link between the two is intuitive: low interest rates make credit cheaper and increase the demand for housing. Some scholars argue that expansionary monetary policy has been significantly responsible for this low level of interest rates and the subsequent house price boom (Ali and Daly, 2010) .A numbers of studies have been undertaken in Kenya focusing on the real estate industry. McGibany and Nourzad (2004) found mortgage rate to be one of the key components of property affordability and performance index in the industry; that a rise in mortgage rate decreases the index and vice versa. Acording to Debelle (2004), most property investments are very sensitive to changes in interest rates. Vries and Boelhouwer (2005) concluded that interest rates, mortgage risks and expected prices are the biggest determinants of property prices in real estate sector.Nguyen (2011) found out that changes in interest rates can greatly influence a person's ability to purchase a residential property and therefore have a major impact on the real estate markets. Wong et al. (2003) found that lower mortgage rates were accompanied by higher house prices and lower

investment during the inflation period. However; during deflationary period, lowering interest rate did not have impact on falling real housing prices. A Wold Bank (2011) report and study by Kamau (2011) indicate that in Kenya, there is a mismatch between the rate of mortgage uptake and the rate at which new properties are shooting up across major towns in the country. Muthaura (2012) investigated the factors that contribute to the cost of borrowing being high and how they can be controlled to increase real estate investment. Omboi and Kigige (2011) analysed the factors influencing real estate property prices in Meru Municipality while focusing on incomes of real estate investors, the influence of location on the price, demand and realtors influence on the price. Mwathi (2013) undertook a survey to establish whether the sources of financing affect the development of real estate development in Kenya while Muriuki (2013) investigated the effect of interest rates volatility on the growth of real estate market in Kenya.

Given the above studies, none of them focused on the effects oeconomic conditions, inflation, loan repayment term and loanable funds affordability on the performance of real estate industry in Nairobi. Therefore, this study intends to fill this knowledge gap. Further, given the importance of real estate sector on the economy of the country, there need to investigate the effect of interest rates on the performance of real estate industry in Nairobi Kenya.

### 1.3 Research Objectives

#### 1.3.1 General objective

The main objective of the study was to investigate the effect of interest rates on performance of real estate industry in Nairobi County in Kenya

#### 1.3.2 Specific objectives

i. To determine how the lending interests rates affect the performance of real estate industry in Nairobi County, Kenya.
ii. To evaluate the effect of deposit interest rates on the performance of real estate industry in Nairobi County, Kenya.
iii. To assess how overdraft interest rates influences the performance of real estate industry in Nairobi County, Kenya.
iv. To investigate the effect of GDP growth on performance of real estate industry in Nairobi County, Kenya.
v. To investigate the effect of inflation on performance of real estate industry in Nairobi County, Kenya.

## 2.0 LITERATURE REVIEW

### 2.1 The Classical Theory of Interest Rates

According to the theory, one side of the market are demand considerations based on marginal utility, while on the other side are supply considerations based on marginal cost. The theory therefore compares the supply of savings with the demand for borrowing. According to Glaeser et al. (2010), using supply and demand curves, the equilibrium rate is calculated by determining the curves intersection point. Thus if savings are greater than investments the interest rate drops until they reach equilibrium and vice versa, if savings are less than investment the interest rate

increases until the reward for savings encourages increased savings rates causing the market to again reach equilibrium. The classical theory of interest rates however fails to account for factors besides supply and demand that may affect interest rates such as the creation of funds, the importance of income and wealth and changes in the primary borrowers in an economy (Krainer, 2009). Modern economic theory has stressed the key role that real interest rates play in economic behaviour, that real interest rates affect investment, which, in turn, affects the aggregate level of economic activity. In addition, monetary policy is given a central role in controlling the level of economic activity through its role in controlling interest rates. Monetary authorities are hypothesized to change nominal interest rates in response to a change in expectations concerning inflation so that the real interest rate adjusts in the desired way (Stiglitz, 1995). The fundamental aspects of this theory relevant to this study are that the theory compares the supply of savings with the demand for borrowing.

### 2.4 Conceptual Framework

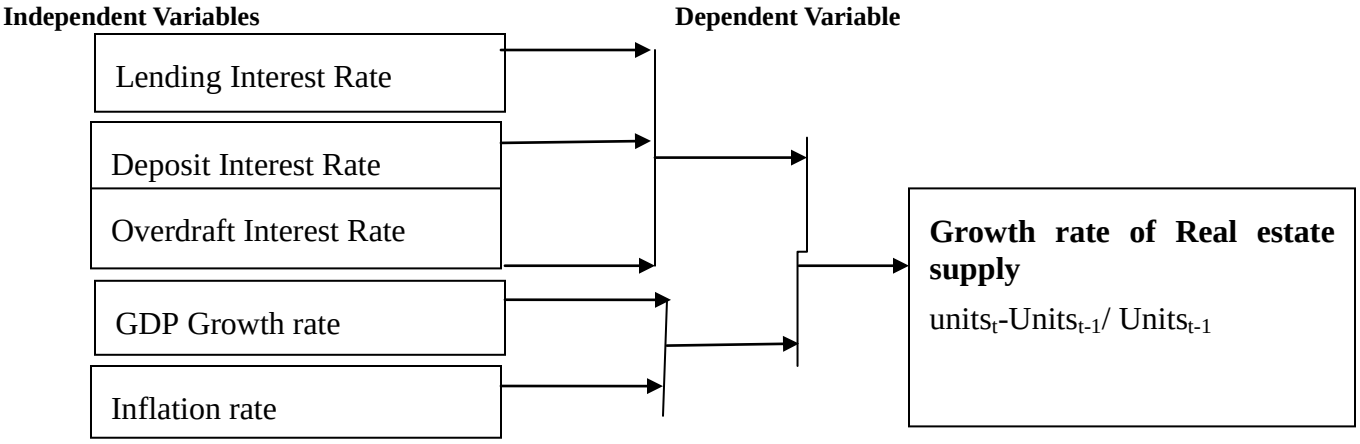


**Figure 1 Conceptual framework**

Source: Author (2016)

### 3.0 RESEARCH METHODOLOGY

The study adopted a descriptive survey research design. The population of interest in this study comprised of all developers operating in Nairobi County. According to the Housing finance corporation report; there were a total of 182 registered developers in Nairobi County by year 2014.Secondary historical unbiased data available to the public was retrieved from the property indices, reports from KNBS, CBK, and selected Real estate firms. The study conducted pre-estimation tests that include correlation tests and unit root tests. The correlation was conducted using correlation matrix to tests the presence of multicollinearity Quantitative data obtained from the questionnaire was analyzed using the Statistical Packages for Social Sciences (SPSS) version 20. This analysis helped to generate descriptive statistics and inferential statistics. Descriptive statistics was used in analysis of percentages, frequencies and mean of responses while inferential statistics generated correlation to show the relationship between the variables under study

## 4.0 RESULTS AND DISCUSSIONS

### 4.1 Experience of the respondents

The study also sought to establish the experience of the respondents. The findings are as presented in Figure 2.

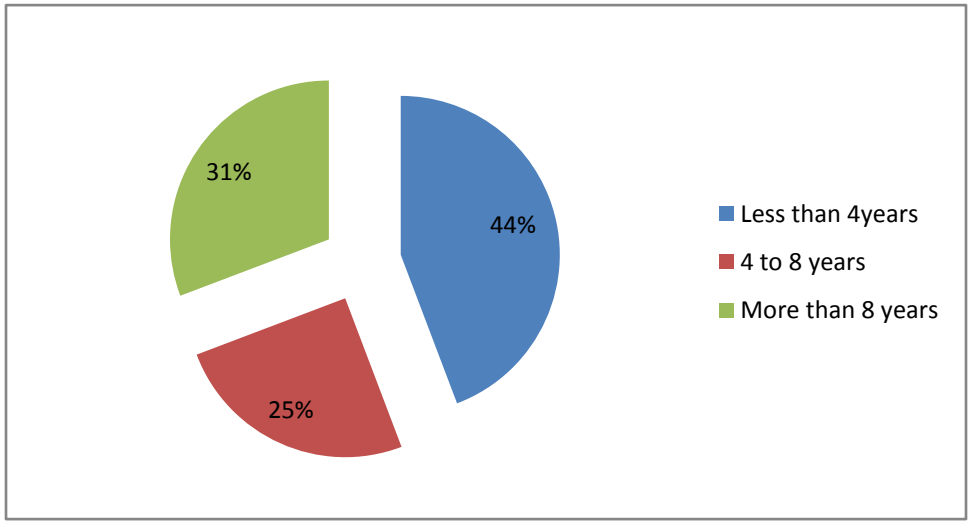


**Figure 2: Experience of the Respondents**

Results in Figure 2 indicate that majority of the respondents, 44%, had worked in the industry for less than 4 years. Only 31% and 25% of the respondents had worked more.

### 4.2 Lending interests rates

The first objective of the study was to determine how the lending interest rates affect the performance of real estate industry in Nairobi County, Kenya. The study used both primary and secondary data for analysis.

#### 4.2.1 Descriptive Statistics of Lending rates using primary data

The respondents were asked to rate various statements regarding lending rates on a scale of 1 to 5. 1 indicated strongly disagree, 2 indicated disagree, 3 indicated strongly disagree, 4 indicated agree and 5 indicated strongly agree. The results are presented in Table 1

**Table 1 Descriptive Statistics of Lending rates using primary data**

| Statement | Mean | Std Dev |
|---|---|---|
| Volatility in lending rates affects people's ability to purchase a residential property | 4.15 | 1.09 |
| Volatility in lending rates influences the decision to invest residential property | 4.00 | 1.28 |
| Lending rates influences the real estate investor's return on investment | 3.73 | 1.40 |
| Volatility in lending rates affects people's return in real estate equity (real estate investment trust) | 3.83 | 1.08 |
| **Average** | **3.93** | **1.21** |

The results indicate that 78.8% of the respondents agreed that volatility in lending rates affects people's ability to purchase a residential property, 75.0% on the other hand agreed that volatility in lending rates influences the decision to invest residential property while those who agreed that lending rates influences the real estate investor's return on investment were 73.1%. The findings also indicated that the number of respondents who agreed that volatility in lending rates affects people's return in real estate equity (real estate investment trust) were 80.8%. The mean response of 4.15, 4.00, 3.73 and 3.83 indicated that the respondents agreed on all the statements concerning lending rates. The overall mean response of 3.93 confirms that the respondents agreed on most of the statements on lending rates. A standard deviation of 1.21 implies that there was a small variation in the responses.This study findings agrees with the argument by Wensheng (2002) who conducted a study on the impact of lending interest rate shocks on the performance of the banking sector, Wensheng (2002) found out that a widening of the spread between Hong Kong dollar and US dollar interest rates, would influence firms' profitability mainly through its impact on asset quality that affects provisioning charges and net interest margin.

### 4.2.2 Trend Analysis of Lending Interests Rates

The trend of lending interest rates was almost synonymous to that of deposit interest rates. Lending interest rates also experienced shard increase in 2011 due to the economic pressure at that time. The lending interest rates were highest at about 20% during the first and second quarter of 2012. Lending interest rates eased up in 2012 following the decision by the Government to externalize an equivalent of USD 600 million of its planned domestic borrowing in the fiscal year 2011/12 through the Revised Budget (CBK, 2012).

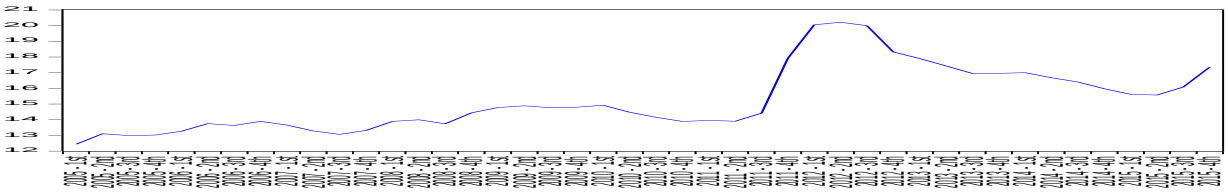

**Figure 3:Trends of Lending Interest Rates between 2005 and 2015**

### 4.3 Deposit interests rates

The second objective of the study was to evaluate the effect of deposit interest rates on the performance of real estate industry in Nairobi County, Kenya. The analysis was conducted using both primary and secondary data.

### 4.3.1 Descriptive Statistics of deposit rates using primary data

The respondents were asked to rate various statements regarding deposit rates on a scale of 1 to 5. 1 indicated strongly disagree, 2 indicated disagree, 3 indicated strongly disagree, 4 indicated agree and 5 indicated strongly agree. The results are presented in Table 2

**Table 2: Descriptive Statistics of deposit rates using primary data**

| Statement | Mean | Std Dev |
|---|---|---|
| Volatility in deposit interest rates affects the cost of financing a residential property | 3.85 | 1.21 |
| Deposit interest rates affects the availability of funds to purchase a residential property | 3.83 | 1.12 |
| Deposit interest rates affects the availability of funds to lease a residential property | 3.88 | 1.25 |
| Deposit interest rates affects the availability of funds to invest in securitized real estate | 3.94 | 1.16 |
| **Average** | **3.88** | **1.18** |

The study findings indicated that 75.0% of the respondents agreed that volatility in deposit interest rates affects the cost of financing a residential property, 76.9% agreed that deposit interest rates affects the availability of funds to purchase a residential property, 80.8% on the other hand agreed that deposit interest rates affects the availability of funds to lease a residential property while those who agreed that deposit interest rates affects the availability of funds to invest in securitized real estate were 78.8%. The mean response of 3.85, 3.83, 3.88 and 3.94 indicates that the respondents agreed on all the statements on deposit interest rates. The overall average response of 3.88 confirms that the respondents agreed on all the statements on deposit interest rates while a standard deviation of 1.18 implies that there was a small variation in the responses on deposit interest rates.The results indicated that deposits rates including volatility affects performance. The findings agree with that of Muriuki (2013) who investigated the effect of interest rates volatility on the growth of real estate market in Kenya. Study findings indicated that the interest market has experienced low volatility. Thus, volatility in the interest market is predictable, at least in the short run. The evidence strongly indicates that the interest rate market is nonlinear and it affects real estate performance.

### 4.3.2 Trend Analysis of Deposit Interests Rates

The results in the figure below show analysis of trend for deposit interest rates. The trend reveals that there was a significant increase in deposit interest rates in 2011. Short term interest rates rose rapidly between October and November 2011 following augmented tightening of monetary policy to curb inflation and stabilise the exchange rate that was equally high. The interbank rate was volatile compared with the 91-day Treasury bill rate during the period. However, pressure on interest rates started easing in January 2012 following the decision by the Government to externalize an equivalent of USD 600 million of its planned domestic borrowing in the fiscal year 2011/12 through the Revised Budget (CBK, 2012)

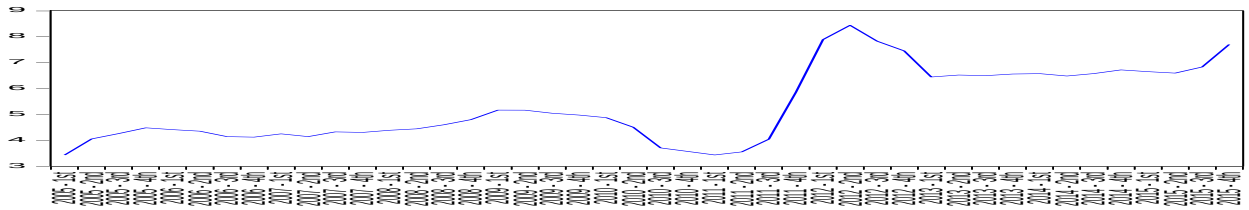

**Figure 4: Trends of Deposit Interest Rates between 2005 and 2015**

### 4.4 Overdraft interests rates

The third objective of the study was to assess how overdraft interest rates influence the performance of real estate industry in Nairobi County, Kenya. The analysis was conducted using both primary and secondary data.

#### 4.4.1 Descriptive Statistics of overdraft interest rates using primary data

The respondents were asked to rate various statements regarding overdraft interest rates on a scale of 1 to 5. 1 indicated strongly disagree, 2 indicated disagree, 3 indicated strongly disagree, 4 indicated agree and 5 indicated strongly agree. The results are presented in Table 3

**Table 3: Descriptive Statistics of overdraft interest rates using primary data**

| Statement | Mean | Std Dev |
|---|---|---|
| Volatility in overdraft rates affects people's ability to purchase a residential property | 3.88 | 1.29 |
| Volatility in overdraft rates influences the decision to invest residential property | 3.90 | 1.19 |
| Overdraft rates influences the real estate investor's return on investment | 3.65 | 1.33 |
| Volatility in overdraft rates affects people's return in real estate equity (real estate investment trust) | 3.77 | 1.31 |
| **Average** | **3.80** | **1.28** |

The results presented indicate that 71.2% of the respondents agreed that volatility in overdraft rates affects people's ability to purchase a residential property, 78.8% of the respondents on the other hand agreed that volatility in overdraft rates influences the decision to invest residential property and those who agreed that overdraft rates influences the real estate investor's return on investment were 71.2%. The number of respondents who indicated that volatility in overdraft rates affects people's return in real estate equity (real estate investment trust) was 67.3%. The mean response of 3.88, 3.90, 3.65 and 3.77 indicate that the respondents agreed on all statements on overdraft rates. The overall average response of 3.80 confirms that the respondents agreed on all the statements on overdraft interest rates. The standard deviation of 1.28 indicates a small variation in the responses. The study findings agrees with the findings of a study by Njiru and Moronge (2013) who undertook a study of the factors affecting growth of mortgage industries in Kenya while focusing on the National Housing Corporation. The study found out that interest rate volatility is one of the key factors that affected growth of mortgage industry in Kenya to great extent compared to credit risk. The findings also agrees with Muthaura (2012) also investigated the relationship between interest rates and real estate investment with a focus of Kenya by analysing the factors that contribute to the cost of borrowing being high and how they can be controlled to increase real estate investment.Study findings indicated that indeed interest rates affect house prices, most real estate retail borrowers and investors alike are forced to increase the house prices to cater for the cost of borrowing and to also break-even.

### 4.4.2 Trend Analysis of Overdraft Interests Rates

Overdraft Interests Rates is the interest rate individuals are charged if they go overdrawn on their current accounts. According to the results in the figure below overdraft interest rate experienced sharp increase similar to the other interest rates in 2011.

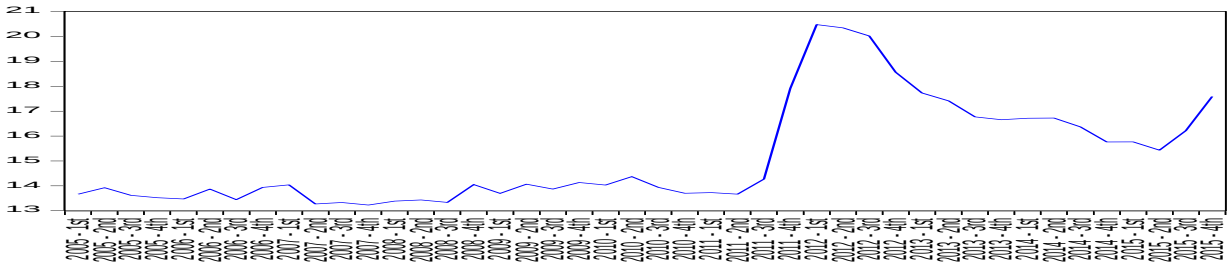


**Figure 5: Trends of Overdraft Interest Rates between 2005 and 2015**

### 4.5 GDP growth rate

The fourth objective of the study was to assess how GDP growth rates influence the performance of real estate industry in Nairobi County, Kenya. The analysis was conducted using both primary and secondary data.

### 4.5.1 Descriptive Statistics of GDP growth rates using primary data

The respondents were asked to rate various statements regarding overdraft interest rates on a scale of 1 to 5. 1 indicated strongly disagree, 2 indicated disagree, 3 indicated strongly disagree, 4 indicated agree and 5 indicated strongly agree. The results are presented in Table 4.5

**Table 4: Descriptive Statistics of GDP growth rates using primary data**

| Statement | Mean | Std Dev |
|---|---|---|
| Unanticipated GDP growth rate influences the decision to invest in real estate | 4.04 | 1.14 |
| Unanticipated GDP growth rate affects the ability to purchase a residential property | 3.96 | 1.25 |
| Volatility in GDP affects demand for residential properties | 3.87 | 1.25 |
| Volatility in GDP affects demand for office spaces | 3.87 | 1.37 |
| **Average** | **3.93** | **1.25** |

The study results indicates that 76.9% of the respondents indicated that unanticipated GDP growth rate influences the decision to invest in real estate as well as the ability to purchase a residential property, 73.1% agreed that volatility in GDP affects demand for residential properties and those who agreed that volatility in GDP affects demand for office spaces were 73.0%. The mean responses of 4.04, 3.96, 3.87 and 3.87 indicate that the respondents agreed on all the statements on GDP growth rate. An overall mean response rate of 3.93 confirmed that the respondents agreed on most of the statements on GDP growth while a standard deviation of 1.25 indicates that there was a small variation in the responses on GDP growth rate.

### 4.6 Trend Analysis of GDP Growth Rates

Economic growth is the increase in the value of goods and services measured by the real gross domestic product. It is measured as a percentage rate of change of the GDP. Economic growth is a complex phenomenon that depends on many factors (Fatás & Mihov, 2009). The period from 2005 henceforth experienced improvement in GDP growth compared to preceding years. The growth experienced a knock around 2008 which can be attributed to post election violence experience at the time. At this time the investor confidence was negatively impacted for fear of the repeat of a state of political instability in the country.


**Figure 6: Trends of Overdraft Interest Rates between 2005 and 2015**

### 4.7 Inflation rate

The fifth objective of the study was to assess how inflation rates influence the performance of real estate industry in Nairobi County, Kenya. The analysis was conducted using both primary and secondary data.

#### 4.7.1 Descriptive Statistics of inflation rates using primary data

The respondents were asked to rate various statements regarding inflation rates on a scale of 1 to 5. 1 indicated strongly disagree, 2 indicated disagree, 3 indicated strongly disagree, 4 indicated agree and 5 indicated strongly agree. The results are presented in Table 5.

**Table 5: Descriptive Statistics of inflation rates using primary data**

| Statement | Mean | Std Dev |
|---|---|---|
| Unexpected inflation influences the decision to invest in real estate | 2.96 | 1.28 |
| Unexpected inflation affects the ability to purchase a residential property | 2.87 | 1.51 |
| Shocks in the aggregate price level affects asset prices | 2.71 | 1.38 |
| Volatility in inflation affects real estate securities | 2.81 | 1.43 |
| **Average** | **2.84** | **1.40** |

The descriptive findings on inflation indicated that 34.6% indicated that unexpected inflation influences the decision to invest in real estate, 42.3% on the other hand agreed that unexpected inflation affects the ability to purchase a residential property, 28.8% of the respondents agreed that shocks in the aggregate price level affects asset prices and those who agreed that volatility in inflation affects real estate securities were 40.4%. Mean response rate of 2.96, 2.87, 2.71 and

2.81 indicate that the respondents were neutral on all the statements on inflation rate. An overall mean response rate of 2.84 confirms that majority of the respondents were indifferent on the statements regarding inflation. A standard deviation of 1.40 on the other hand indicated a small variation on the responses. The findings agrees with those of Ngugi (2007) who found out that for Kenya, rising inflation resulting from expansionary fiscal policy, tightening of monetary policy, yet-to-be realized efficiency of banks and high intermediation costs explained interest rate spreads in Kenya. Saunders and Schumacher (2000) also offered evidence that uncertainty caused by inflation in banks' economic environment is one important cause of bank spreads. Khawaja and Din (2007) concluded that any rise in inflation increases the credit risk premium and interest rates hampering loan repayment capacity of borrowers.

### 4.7.2 Trend Analysis of Inflation Rates

The trend result reveals that Kenya inflation was very volatile during the study period. The inflation was low in 2005 to 2007 which was followed by significant increase in 2008 going up to about 17%. This increase corresponds to the period when Kenya was hit by the worst post election violence. The inflation then eased the following year reaching a low of about 4% in 2010. The economic pressure experienced in 2011 due to high exchange rates and high oil prices caused inflation to increase again in 2011 which again dropped in 2012 due to the measure taken by the government. From 2012 to date the inflation rate has oscillated between 4% and 9%.

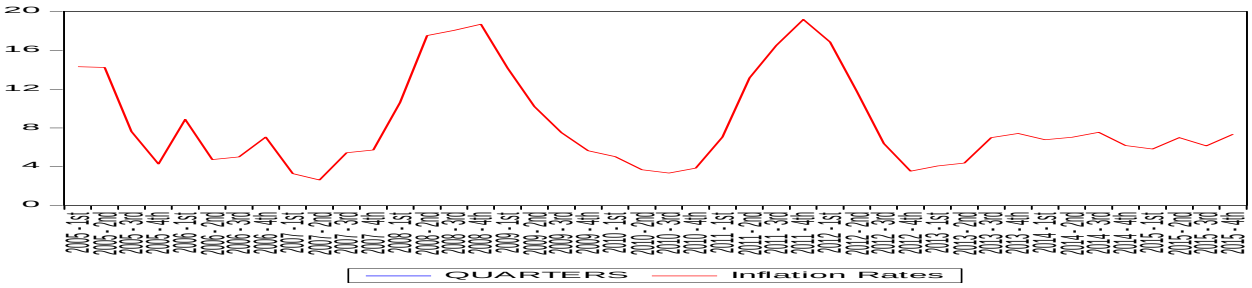


Figure 4.8 Trends of Inflation Rates between 2005 and 2015

### 4.7.3 Trend Analysis of Real Estate Supply Growth Rates

The supply of housing units has been very volatile during the study period. The result reveals that low supply of units by the real estate firms in Kenya corresponded to high inflation. These findings imply that supply growth of rates increase when the economic situation is favourable.

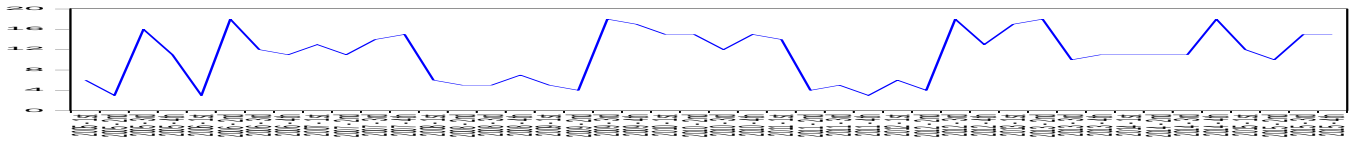

**Figure 7: Trends of Real Estate Supply Growth Rates between 2005 and 2015**

### 4.7.4 Real Estate Supply Rates per Quarter

The study aimed to find out in which quarter of the financial year was the real estate supply highest. The result revealed that the growth of real estate was high during the last and the first quarter of the year.

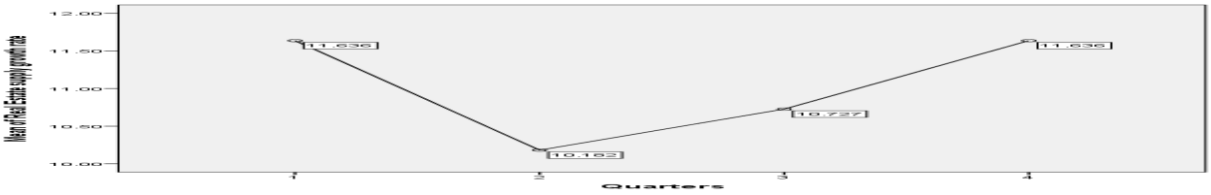


**Figure 8: Real Estate Supply Rates per Quarter between 2005 and 2015**

### 4.7.5 Descriptive Statistics using secondary data

The results in the table below show the descriptive statistics of the study variables. They include mean, median, maximum and minimum values and other tests for dispersion. The findings show that during the study period (2005-2015) the mean for deposit interest rates was 5.32%, the maximum value was 8.44% while the minimum value was 3.433%. GDP growth had a mean of 5.537%, the maximum value was 11.50% while the minimum value was 1.10%. Inflation rates had a mean of 8.47%, the maximum value was 19.18% while the minimum value was 2.62%. Lending interest rates and overdraft interest rates had means of 15.24% and 15.16% respectively.

**Table 6: Descriptive Statistics of Study Variables**

| | Deposit Interest Rates | GDP Growth | Inflation Rates | Lending Interest Rates | Overdrafts Interest Rate | Real Estate Supply Growth |
|---|---|---|---|---|---|---|
| Mean | 5.324242 | 5.537209 | 8.470758 | 15.24644 | 15.16864 | 11.04545 |
| Median | 4.838333 | 5.700000 | 7.015000 | 14.62000 | 14.04333 | 11.00000 |
| Maximum | 8.446667 | 11.50000 | 19.18667 | 20.21333 | 20.48000 | 18.00000 |
| Minimum | 3.433333 | 1.100000 | 2.626667 | 12.43667 | 13.22667 | 3.000000 |
| Std. Dev. | 1.403270 | 2.089432 | 4.779613 | 2.046013 | 2.078529 | 4.734606 |
| Skewness | 0.528098 | 0.261526 | 0.959912 | 0.903727 | 1.134870 | -0.147054 |
| Kurtosis | 2.040536 | 3.363247 | 2.665145 | 2.940922 | 3.230307 | 1.778935 |
| Jarque-Bera | 3.732887 | 0.726577 | 6.962731 | 5.995698 | 9.542070 | 2.892081 |
| Probability | 0.154673 | 0.695386 | 0.030765 | 0.049894 | 0.008472 | 0.235501 |
| Sum | 234.2667 | 238.1000 | 372.7133 | 670.8433 | 667.4200 | 486.0000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Sum Sq. Dev. | 84.67412 | 183.3605 | 982.3221 | 180.0052 | 185.7722 | 963.9091 |
| **Observations** | **44** | **43** | **44** | **44** | **44** | **44** |

### 4.8 Pre estimation results

The stationarity of the variables was tested before running the regression model. Most economic variables are usually non-stationary in nature and prior to running a regression analysis unit root tests were thus conducted using the Levin Liu & Chu test to establish whether the variables were stationary or non-stationary.

#### 4.8.1 Unit Root Tests for Study Variables

The purpose of running unit roots tests was to avoid spurious regression results being obtained by using non-stationary series. Results in Table 4.3 indicated that all variables are non-stationary except inflation.

**Table 7 Unit Root Test Results**

| Variable name | Statistics | Prob value | Comment |
|---|---|---|---|
| **Deposit Interest Rates** | 1.07699 | 0.1407 | Non Stationary |
| **Lending Interest Rates** | 1.11254 | 0.1330 | Non Stationary |
| **Overdraft Interest Rates** | 2.52853 | 0.9943 | Non Stationary |
| **Inflation** | 21.2171 | 0.0000 | Stationary |
| **GDP Growth** | 2.21416 | 0.9866 | Non Stationary |

Variable that were non-stationary were converted to stationary by using their first differencing. The probability value of less than 0.05 indicates that the null hypothesis that there is unit root was rejected hence the variable were stationary.

**Table 8: Unit Root Test Results at First Differencing**

| Variable name | Statistics | Prob value | Comment |
|---|---|---|---|
| **D(Deposit Interest Rates)** | 12.2937 | 0.000 | Stationary |
| **D(Lending Interest Rates)** | 19.9182 | 0.000 | Stationary |
| **D(Overdraft Interest Rates)** | 77.4261 | 0.000 | Stationary |
| **Inflation** | 21.2171 | 0.000 | Stationary |
| **D(GDP Growth)** | 9.98116 | 0.000 | Stationary |

### 4.10 Inferential statistics

The inferential analysis was also conducted so as to test the objectives of the study. Both correlation and regression analysis was used.

#### 4.10.1 Correlation Results for Study Variables

A correlation test was conducted to establish the association between the study variables. The finding show that inflation had a negative association with real estate growth (r=-0.44). Deposit interest rates also had a negative association with real estate growth rate (r=-0.252). Similarly the study established a negative correlation between lending interest rates (r=-0.287) and overdrafts interest rates (r=-0.226). The study also established that deposit interest rates, lending interest rate and overdraft interest rates were highly correlated. First differencing was used to control for multicollinearity.

**Table 9: Correlation Results**

| | | Inflation Rates | GDP growth | deposit interest rates | lending interest rates | overdrafts interest rates |
|---|---|---|---|---|---|---|
| Inflation Rates | Pearson Correlation | 1 | | | | |
| | Sig. (2-tailed) | | | | | |
| | N | 44 | | | | |
| GDP growth | Pearson Correlation | -.451** | | | | |
| | Sig. (2-tailed) | 0.002 | | | | |
| | N | 43 | | | | |
| Deposit Interest Rates | Pearson Correlation | 0.254 | -0.235 | | | |
| | Sig. (2-tailed) | 0.097 | 0.129 | | | |
| | N | 44 | 43 | | | |
| Lending Interest Rates | Pearson Correlation | 0.265 | -0.145 | .953** | | |
| | Sig. (2-tailed) | 0.082 | 0.354 | 0.000 | | |
| | N | 44 | 43 | 44 | | |
| Overdrafts Interest Rates | Pearson Correlation | 0.284 | -0.138 | .947** | .985** | |
| | Sig. (2-tailed) | 0.062 | 0.377 | 0.000 | 0.000 | |
| | N | 44 | 43 | 44 | 44 | |
| Real Estate supply growth rate | Pearson Correlation | -.444** | 0.296 | -0.252 | -0.287 | -0.226 |

| | | | | | |
|---|---|---|---|---|---|
| Sig. (2-tailed) | 0.003 | 0.054 | 0.099 | 0.059 | 0.141 |
| N | 44 | 43 | 44 | 44 | 44 |

** Correlation is significant at the 0.01 level (2-tailed)

The first objective of the study was to determine how lending interest rates affect the performance of real estate industry in Nairobi County, Kenya. The correlation results indicated a negative association between lending interest rates and real estate supply growth rate. This implies that an increase in lending rates is associated with poor performance of real estate industry. The findings also agrees with the findings of a study by Chan, Erickson, and Wang (2003) who suggested that performance of real estate stock and real estate investment were partly related to interest rates.The second objective of the study was to evaluate the effect of deposit interest rates on performance of real estate industry in Nairobi County, Kenya. The correlation results indicated a negative association between deposit interest rates and real estate supply growth rate. This implies that an increase in deposit interest rates is associated with poor performance of real estate industry. The study findings do not agree with the findings of a study by Njihia (2005) who found out that the loan component have a significant effect on quoted firms' profit. The third objective of the study was to assess how overdraft interest rates influences performance of real estate industry in Nairobi County, Kenya. The correlation results indicated a negative association between overdraft interest rates and real estate supply growth rate. This implies that an increase in overdraft interest rates is associated with poor performance of real estate industry. The findings are in line with the findings of a study by Bredin, O'Reilly, and Stevenson (2007) who argued that interest rate affect performance of real estate.The fourth objective of the study was to investigate the effect of GDP growth on performance of real estate industry in Nairobi County, Kenya. The correlation results indicated a positive association between GDP growth and real estate supply growth rate. This implies that an improvement in GDP growth is associated with better performance of real estate industry.The fifth objective of the study was to investigate the effect of inflation on performance of real estate industry in Nairobi County, Kenya. The correlation results indicated a negative association between inflation and real estate supply growth rate. This implies that an increase in inflation is associated with poor performance of real estate industry. These findings agree with He, Webb, and Myer (2003) who argued that interest rate affect performance of real estate.

### 4.10.2 Regression Results for Long Run Effects of Interest Rates on Real Estate Performance

The study conducted a long run model where variables in the model were in original form. The result indicates that the independent variables accounted for 0.404378 of the variation in the dependent variation. These findings imply that interest rates accounted for 40% of the variation in the performance of real estate in Nairobi. The results of F-statistics also reveal that the long run model was statistically significant. The first objective of the study was to determine how lending interest rates affect the performance of real estate industry in Nairobi County, Kenya. The long run regression model findings revealed that lending interest rates had a negative and

significant (B= -6.137615, p=0.0018) relationship with real estate growth in Nairobi. This finding implies that increase in lending interest rates will have negative effects on growth of real estate firm in Nairobi in the long run. The findings agrees with the findings of a study by Wensheng (2002) on the impact of lending interest rate shocks on performance which found out that a rise in interest rates, would influence banks' profitability mainly through its impact on asset quality that affects provisioning charges and net interest margin. The second objective of the study was to evaluate the effect of deposit interest rates on performance of real estate industry in Nairobi County, Kenya. The long run regression model findings show that deposit interest rates were insignificantly (B= 1.4032, p=0.3911) related to growth of the real estate firm in Nairobi. The findings indicate that in the long run, deposit interest rate have no significant effect on performance of real estate industry. The study findings are consistent with the findings of a study by Mei and Saunders (2005) which indicated that there was negative relationship between deposit interest rate spread and performance of real estate. The findings are however inconsistent with Sanders (2007) paper which argued that performance of real estate could be affected by interest rate.The third objective of the study was to assess how overdraft interest rates influences performance of real estate industry in Nairobi County, Kenya. The long run regression model findings reveal that overdraft interest rates have a significant and positive (B= 4.889605, p=0.0066) relationship with real estate growth in Nairobi. This implies that in the long run, the performance of real estate industry relies on overdraft interest rate. The findings also reveal that an improvement in overdraft interest rates in the long run positively affects performance of real estate industry. The fourth objective of the study was to investigate the effect of GDP growth on performance of real estate industry in Nairobi County, Kenya. The long run regression results reveal that GDP growth has a positive but insignificant relationship with performance of real estate firms in Nairobi. The findings imply that given a long period of time, GDP growth is not significantly related to performance of real estate industry. The study findings confirm the argument by Thornton (2006) that when the economy is sluggish the real estate business takes a negative growth.The fifth objective of the study was to investigate the effect of inflation on performance of real estate industry in Nairobi County, Kenya. The long run regression results indicate that inflation has a negative and significant relationship with the performance of real estate firms. The findings imply that given a long period of time, an increase in inflation rate leads to poor performance of real estate developers. These study findings are consistent with the findings of a study by and Nishigaki (2007) which found that in the long run, the relationship between performance of real estate and inflation is negative.

**Table 10: Long Run Model Results**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| DEPOSIT_INTEREST_RATES | 1.403272 | 1.617171 | 0.867732 | 0.3911 |
| LENDING_INTEREST_RATES | -6.137615 | 1.819354 | -3.373512 | 0.0018 |
| OVERDRAFTS_INTEREST_RATE | 4.889605 | 1.696915 | 2.881467 | 0.0066 |

| | | | | |
|---|---|---|---|---|
| INFLATION_RATES | -0.389444 | 0.146804 | -2.652818 | 0.0117 |
| GDP_GROWTH | 0.278513 | 0.349396 | 0.797126 | 0.4305 |
| C | 24.57334 | 8.058417 | 3.049400 | 0.0042 |

| | | | |
|---|---|---|---|
| R-squared | 0.404378 | Mean dependent var | 10.90698 |
| Adjusted R-squared | 0.323888 | S.D. dependent var | 4.699615 |
| S.E. of regression | 3.864306 | Akaike info criterion | 5.670229 |
| Log likelihood | -115.9099 | Hannan-Quinn criter. | 5.760853 |
| F-statistic | 5.023980 | Durbin-Watson stat | 0.760080 |
| Prob(F-statistic) | 0.001303 | | |

### 4.10.3 Regression results for short run effects of interest rates on real estate performance

The study conducted a short run model where first differences of the variables were used. The result indicates that the independent variables accounted for 0.450097 of the variation in the dependent variation. These findings imply that interest rates accounted for 45% of the variation in the performance of real estate in Nairobi. The results of F-statistics also reveal that the long run model was statistically significant.

**Table 11: Short Run Model Results**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| DDEPOSIT | -4.219610 | 2.633810 | -1.602094 | 0.1212 |
| DLENDING | -2.123263 | 3.000342 | -0.707673 | 0.4854 |
| DOVERDRAFT | 4.765088 | 2.581913 | 1.845565 | 0.0764 |
| DGDP | 0.159168 | 0.351806 | 0.452432 | 0.6547 |
| DINFLATION | -0.832442 | 0.221156 | -3.764047 | 0.0009 |
| C | 0.571064 | 0.679678 | 0.840198 | 0.4085 |

| | | | |
|---|---|---|---|
| R-squared | 0.450097 | Mean dependent var | 0.656250 |
| Adjusted R-squared | 0.344347 | S.D. dependent var | 4.498095 |
| S.E. of regression | 3.642216 | Akaike info criterion | 5.590422 |
| Sum squared resid | 344.9092 | Schwarz criterion | 5.865248 |
| Log likelihood | -83.44676 | Hannan-Quinn criter. | 5.681519 |

| | | | |
|---|---|---|---|
| F-statistic | 4.256220 | Durbin-Watson stat | 2.225869 |
| Prob(F-statistic) | 0.005834 | | |

The first objective of the study was to determine how lending interest rates affect the performance of real estate industry in Nairobi County, Kenya. The short run regression model findings revealed that lending interest rates had a negative and but insignificant relationship with real estate growth in Nairobi. This finding implies that in the short run, lending interest rates have no significant effect on growth of real estate firms in Nairobi in the short run. The findings are not consistent with the findings of a study by Wensheng (2002) as well as Njihia (2005) which stated that a rise in interest rates influences performance negatively and significantly.The second objective of the study was to evaluate the effect of deposit interest rates on performance of real estate industry in Nairobi County, Kenya. The short run regression model findings show that deposit interest rates were negatively and insignificantly related to growth of the real estate firm in Nairobi. The findings indicate that in the short run, deposit interest rate have no significant effect on performance of real estate industry. The findings are consistent with the findings of a study by He, Webb, and Myer (2003) ; Bredin, O'Reilly and Stevenson (2007); Devaney (2001) who provided evidence to support the argument that deposit interest rate affected performance of real estate. The evidence showed that real estate excess return is negatively affected by deposit interest rate and its conditional variance. The third objective of the study was to assess how overdraft interest rates influences performance of real estate industry in Nairobi County, Kenya. The short run regression model findings reveal that overdraft interest rates have a positive but insignificant relationship with real estate growth in Nairobi. This implies that in the short run, the performance of real estate industry is insignificantly related to overdraft interest rate. The fourth objective of the study was to investigate the effect of GDP growth on performance of real estate industry in Nairobi County, Kenya. The short run regression results reveal that GDP has a positive but insignificant relationship with performance of real estate firms in Nairobi. The findings imply that given a short period of time, GDP growth cannot be used to explain the performance of real estate industry in Kenya. The study findings confirm the argument by Thornton (2006) that when the economy is sluggish the real estate business takes a negative growth.The fifth objective of the study was to investigate the effect of inflation on performance of real estate industry in Nairobi County, Kenya. The short run regression results indicate that inflation has a negative and significant relationship with performance of real estate firms. The findings imply that given a short period of time, an increase in inflation leads to poor performance of real estate developers. The findings further imply that inflation can be used to explain the performance of real estate industry in the short run. The study findings agree with the findings of Geltner et al. (2007) who found that high inflation reduces the value of money and thereby loss of purchasing power making future prices in real estate very difficult to predict. The findings also confirm the argument by Cheng et al. (2010); Vandell (2007) that inflation causes variation in expected real returns.

### 4.11 Residual Diagnostic Tests

The test for normality was examined using the graphical method approach as shown in the Figure below. The results in the figure indicate that the residuals are normally distributed. To further establish whether the residuals are normally distributed the study adopted the Jarque-Bera test which is a more conclusive test than the graphical inspection approach of testing for normality. The results of the Jarque-Bera test are shown below. The null hypothesis under this test is that the residuals are not significantly different from a normal distribution. Given that the p-value is greater than 5% for the residual, the null hypothesis is accepted and thus the conclusion that the residuals are normally distributed.

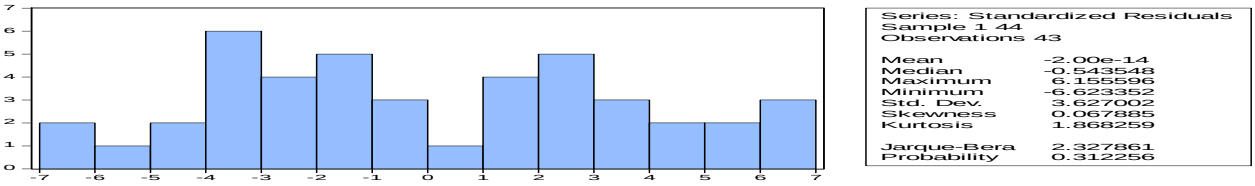


Figure 9 Normality Test

## 5.0 DISCUSSION CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Summary of Findings

#### 5.1.2 Lending Interests Rates and Real Estate performance

The study sought to establish the effects of lending interests rates on the performance of real estate industry in Nairobi County in Kenya. The study findings further revealed that lending interest rates had a negative and significant relationship with real estate growth in Nairobi. This finding implies that increase in lending interest rates will have negative effects on growth of real estate firm in Nairobi.

#### 5.1.3 Deposit Interest Rates and Real Estate performance

The study also sought to establish the relationship between deposit interest rates and performance of real estate in Nairobi, Kenya. The findings show that deposit interest rates were insignificantly related to growth of the real estate firm in Nairobi. These finding imply that the volatility in deposit interest rates have no significant effects on the performance of real estate firms in Nairobi county.

#### 5.1.4 Overdraft Interest Rates and Real Estate performance

The study sought to establish the effects of lending interests rates on the performance of real estate industry in Nairobi County in Kenya. The long run model findings also revealed that overdraft interest rates had a significant relationship with real estate growth in Nairobi.

#### 5.1.5 Macro-economic and Real Estate performance

The study also sought to find out the relationship between macro-economic variables and performance of real estate firms in Nairobi County. The findings revealed that inflation had a negative and significant relationship with performance of real estate firms in Nairobi. GDP growth was found to have a positive relationship with the performance of real estate firms

though the relationship was insignificant.The overall long run model results indicated that the independent variables accounted for 0.404378 of the variation in the dependent variation. The result of the short run model indicates that the independent variables accounted for 0.450097of the variation in the dependent variation. These findings imply that interest rates accounted for over 40% of the variation in the performance of real estate in Nairobi. The results of F-statistics also reveal that the long run model was statistically significant.

### 5.2 Conclusion

Demand in real estate in Kenya grows exponentially despite the volatile interest rate and tightening liquidity through CBK's monetary policies. Real estate has defied economic fundamentals such as higher interest rates, spiraling inflation (which nearly hit 20 per cent in 2011, but is now on a retreat), and a weak shilling. Within the same year prices for everything increase erratically, ranging from land, construction materials, to interest rates.The increase in growth of real estate market despite the high interest rate could owe to the price inelastic demand for housing owing to economic disparity in the country. While low income earners, who are majority, are pushed away to less glossy and crowded homes where survival supersedes luxury, the upper middle income purchase of housing units is on the upward spiral in Nairobi. The underlying reason is that Kenya is a hub for multinationals and international organizations like the United Nations whose staff often takes up executive apartments and stand-alone units, and has helped to push up not just demand, but prices too. Additionally, Kenya's middle class is among the fastest growing in Africa, buoyed by a rebound in earnings from a growing economy.

### 5.3 Suggestions for Further Research

A study can be designed to find out what factors to consider in determining duration of holding on to property. This will give an indication on the effects of duration of holding property on real estate industry performance. From the findings and conclusion, the study recommends and in-depth study to be carried out on the relationship between inflation and time duration of property development. This will help to allow more insight on the impact of inflation on real estate performance.It would be important to carry out a study with a bias to determining the relationship between country economic growth and real estate industry performance. This will assist more knowledge on the strength of impact of economic growth and development on real estate industry performance. In order to better understand the aspects of mortgage pricing it would be interesting to carry out a study to determine the factors that determine mortgage pricing and their effect on Real estate performance.The study findings also indicated that interest rates explain 40% of the changes in performance of real estate firms in the long run and 45% in the shorter run. This implies that the remaining 60% and 55% respectively is explained by other factors not investigated by this study. A study can be conducted determine the determinants of real estate firms performance and among the variables to consider can be firm size, marketing strategies, external environment, governance among others which have not been addressed by this study. This study considered only external factors which cannot be controlled by the firm.A study can also be conducted to determine the consumer's perception and attitudes towards products in the real estate industry or the determinants of consumer's investment decisions in real estate.

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